



#14

SEQUENCE LISTING

<110> Epimmune, Inc.
Sidney, John
Sette, Alessandro
Grey, Howard
Southwood, Scott

<120> SUBUNIT VACCINES WITH A2 SUPERMOTIFS

<130> 39963-20029.20

<140> US 09/935,476

<141> 2001-08-22

<150> US 09/346,105

<151> 1999-06-30

<150> US 60/264,969

<151> 2001-01-29

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<170> FastSEQ for Windows Version 4.0

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Asn Val Val Asn Ser
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W, X, Y

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W, X, Y

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W, X, Y

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T, V, W, X, Y

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T, V, W, X, Y

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W, X, Y

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<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = Y

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>

<221> VARIANT

<222> 5

<223> Xaa = Any amino acid

<220>

<221> VARIANT

<222> 6

<223> Xaa = Any amino acid

<220>

<221> VARIANT

<222> (7)...(7)

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> (8)...(8)

<223> Xaa = A, C, E, F, G, H, I, K, L, M, P, R, S, T, V,
W, X, Y

<220>
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<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 38
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 39
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = W

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = Any amino acid

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
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<222> (7)...(7)
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, R, S, T, V,

W, X, Y

<220>

<221> VARIANT

<222> (8)...(8)

<223> Xaa = A, C, E, F, G, H, I, K, L, M, P, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> (10)...(10)

<223> Xaa = L, V, I, A, T, M

<400> 39

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 40

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<222> 5

<223> Xaa = D

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<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, R, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = A, C, E, F, G, H, I, K, L, M, P, R, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
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<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 40
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 41
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<222> 1
<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
<221> VARIANT

<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<223> Xaa = E

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<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

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W, X, Y

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W, X, Y

<220>
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<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 41
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 42
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<223> Xaa = Any amino acid

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<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
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<223> Xaa = L

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<222> (8)...(8)
<223> Xaa = A, C, E, F, G, H, I, K, L, M, P, R, S, T, V,
W, X, Y

<220>
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W, X, Y

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 42
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 43
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<222> 1
<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
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<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
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<220>
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<222> 6
<223> Xaa = Any amino acid

<220>
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<223> Xaa = V

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<222> (8)...(8)
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W, X, Y

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W, X, Y

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<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 43
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 44
<211> 10
<212> PRT
<213> Artificial Sequence

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W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
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<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = Any amino acid

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<223> Xaa = Any amino acid

<220>
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<222> (7)...(7)
<223> Xaa = I

<220>
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<222> (8)...(8)
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W, X, Y

<220>
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<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>

<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 44
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 45
<211> 10
<212> PRT
<213> Artificial Sequence

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W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
<221> VARIANT
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
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<222> 5
<223> Xaa = Any amino acid

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<223> Xaa = Any amino acid

<220>
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<223> Xaa = M

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<222> (8)...(8)
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W, X, Y

<220>
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<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
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<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 45
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 46
<211> 10
<212> PRT
<213> Artificial Sequence

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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = Any amino acid

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
<221> VARIANT

<222> (7)...(7)
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, R, S, T, V,
W, X, Y

<220>
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<223> Xaa = H

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 46
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 47
<211> 10
<212> PRT
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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
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<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<223> Xaa = Any amino acid

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<223> Xaa = Any amino acid

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W, X, Y

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<222> (9)...(9)
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W, X, Y

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<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 47
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 48
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, H, I, L, M, N, P, Q, S, T, V, W, X,
Y

<220>
<221> VARIANT

<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<223> Xaa = Any amino acid

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<222> 6
<223> Xaa = Any amino acid

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W, X, Y

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<222> (8)...(8)
<223> Xaa = K

<220>
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<222> (9)...(9)
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W, X, Y

<220>
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<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 48
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 49
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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<222> 1
<223> Xaa = F, Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = any amino acid

<220>
<221> VARIANT
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<223> Xaa = L, V, I, M

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = H, R, K

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 49
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 50
<211> 9
<212> PRT
<213> Artificial Sequence

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<223> Xaa = Y

<220>

<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
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<223> Xaa = A, C, F, G, H, I, L, M, N, P, Q, S, T, V, W,
X, Y

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<222> 4
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 5
<223> Xaa = A, C, D, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 6
<223> Xaa = C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> (7)...(7)
<223> Xaa = A, C, F, G, H, I, K, L, M, N, P, Q, R, S, T,
V, W, X, Y

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> (9)...(9)
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<400> 50
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 51
<211> 9
<212> PRT
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<220>
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<223> Xaa = F

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<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, C, F, G, H, I, L, M, N, P, Q, S, T, V, W,
X, Y

<220>
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<222> 4
<223> Xaa = any amino acid

<220>
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<222> 5
<223> Xaa = A, C, D, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
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<222> 6
<223> Xaa = C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
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V, W, X, Y

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = L, V, I, A, T, and M

<400> 51
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 52
<211> 9
<212> PRT
<213> Artificial Sequence

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T, V, W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

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<221> VARIANT
<222> 3
<223> Xaa = A

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<222> 4
<223> Xaa = any amino acid

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T, V, W, X, Y

<220>
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T, V, W, X, Y

<220>
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V, W, X, Y

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = L, V, I, A, T, and M

<400> 52
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 53
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<223> Xaa = Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A

<220>
<221> VARIANT
<222> 4
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 5
<223> Xaa = A, C, D, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 6
<223> Xaa = C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> (7)...(7)
<223> Xaa = A, C, F, G, H, I, K, L, M, N, P, Q, R, S, T,
V, W, X, Y

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = L, V, I, A, T, and M

<400> 53
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 54
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<223> Xaa = F

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = A

<220>
<221> VARIANT
<222> 4
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 5
<223> Xaa = A, C, D, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
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<223> Xaa = C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S,
T, V, W, X, Y

<220>
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<223> Xaa = A, C, F, G, H, I, K, L, M, N, P, Q, R, S, T,
V, W, X, Y

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = L, V, I, A, T, and M

<400> 54
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 55
<211> 10
<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = F

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = F, Y, W

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>

<221> VARIANT

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<223> Xaa = D, E

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<221> VARIANT

<222> 6

<223> Xaa = Any amino acid

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<221> VARIANT

<222> (7)...(7)

<223> Xaa = L, V, I, M

<220>

<221> VARIANT

<222> (8)...(8)

<223> Xaa = H, R, K

<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> (10)...(10)

<223> Xaa = L, V, I, A, T, M

<400> 55

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa

1

5

10

<210> 56
<211> 10
<212> PRT
<213> Artificial Sequence

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<223> Xaa = Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
<221> VARIANT
<222> (7)...(7)
<223> Xaa = L, V, I, M

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = H, R, K

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
<221> VARIANT
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<223> Xaa = L, V, I, A, T, M

<400> 56

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 57

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = F

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<221> VARIANT

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<223> Xaa = D, E

<220>

<221> VARIANT

<222> 6

<223> Xaa = Any amino acid

<220>

<221> VARIANT

<222> (7)...(7)

<223> Xaa = L, V, I, M

<220>

<221> VARIANT

<222> (8)...(8)

<223> Xaa = H, R, K

<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> (10)...(10)

<223> Xaa = L, V, I, A, T, M

<400> 57

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 58

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = Y

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>

<221> VARIANT

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<220>

<221> VARIANT

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<223> Xaa = Any amino acid

<220>

<221> VARIANT

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<223> Xaa = L, V, I, M

<220>

<221> VARIANT

<222> (8)...(8)
<223> Xaa = H, R, K

<220>
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W, X, Y

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<223> Xaa = L, V, I, A, T, M

<400> 58
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 59
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = W

<220>
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<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

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<221> VARIANT
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<223> Xaa = L, V, I, M

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = H, R, K

<220>
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W, X, Y

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<400> 59
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 60
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<213> Artificial Sequence

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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<223> Xaa = Any amino acid

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<223> Xaa = L, V, I, M

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<223> Xaa = H, R, K

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W, X, Y

<220>
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<400> 60
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 61
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

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<223> Xaa = Any amino acid

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<223> Xaa = L, V, I, M

<220>
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<222> (8)...(8)
<223> Xaa = H, R, K

<220>
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W, X, Y

<220>
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<223> Xaa = L, V, I, A, T, M

<400> 61
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 62
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<212> PRT
<213> Artificial Sequence

<220>
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W, X, Y

<220>
<221> VARIANT
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
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T, V, W, X, Y

<220>
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<223> Xaa = D, E

<220>
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<223> Xaa = Any amino acid

<220>
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<222> (8)...(8)
<223> Xaa = H, R, K

<220>
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W, X, Y

<220>
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<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 62
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 63
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = F, Y, W

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>

<221> VARIANT

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<223> Xaa = D, E

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<221> VARIANT

<222> 6

<223> Xaa = Any amino acid

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<223> Xaa = H, R, K

<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

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<222> (10)...(10)

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<400> 63

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa

1

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10

<210> 64

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = F, Y, W

<220>

<221> VARIANT

<222> 4

<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>

<221> VARIANT

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<220>

<221> VARIANT

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<223> Xaa = Any amino acid

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<222> (8)...(8)

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<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>

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<222> (10)...(10)

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<400> 64

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa

1

5

10

<210> 65

<211> 10

<212> PRT
<213> Artificial Sequence

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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

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<222> (8)...(8)
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<220>
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W, X, Y

<220>
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<223> Xaa = L, V, I, A, T, M

<400> 65

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 66
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
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W, X, Y

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
<221> VARIANT
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
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<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
<221> VARIANT
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<223> Xaa = L, V, I, M

<220>
<221> VARIANT
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<220>
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W, X, Y

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<223> Xaa = L, V, I, A, T, M

<400> 66
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 67
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<212> PRT
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<223> Xaa = A, C, F, G, H, I, K, L, M, N, Q, R, S, T, V,
W, X, Y

<220>
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<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
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<223> Xaa = Any amino acid

<220>
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<223> Xaa = L, V, I, M

<220>
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<222> (8)...(8)
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W, X, Y

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<223> Xaa = L, V, I, A, T, M

<400> 67
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 68
<211> 10
<212> PRT
<213> Artificial Sequence

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W, X, Y

<220>
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<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
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<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
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<220>
<221> VARIANT
<222> (8)...(8)
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<220>
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W, X, Y

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<400> 68
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 69
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<212> PRT
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<220>
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<221> VARIANT
<222> 2
<223> Xaa = L, M, V, T, Q, A, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, Y, W

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, C, D, E, F, G, H, I, K, L, M, N, Q, R, S,
T, V, W, X, Y

<220>
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<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Any amino acid

<220>
<221> VARIANT
<222> (7)...(7)
<223> Xaa = L, V, I, M

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = H, R, K

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = A, C, D, E, F, G, I, L, M, N, P, Q, S, T, V,
W, X, Y

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, V, I, A, T, M

<400> 69
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 70
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
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<222> 1
<223> Xaa = D, E, P

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, I, V, A, T, Q

<220>
<221> VARIANT
<222> 3
<223> Xaa = G, R, H, K

<220>
<221> VARIANT
<222> 4
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 5
<223> Xaa = L, I, M, Y, F, W

<220>
<221> VARIANT
<222> 6
<223> Xaa = A, Y, F, W

<220>
<221> VARIANT
<222> (7)...(7)
<223> Xaa = G, P

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = V, L, I, A, T

<400> 70
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 71
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = F, Y, D, E, P, Q

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, I, V, A, T, Q

<220>
<221> VARIANT
<222> 3
<223> Xaa = F, W, Y, E, R, K

<220>
<221> VARIANT
<222> 4
<223> Xaa = W, M

<220>
<221> VARIANT
<222> 5
<223> Xaa = H, Y, E, N

<220>
<221> VARIANT
<222> 6
<223> Xaa = R, H, K

<220>
<221> VARIANT

<222> (7)...(7)
<223> Xaa = F, W, Y, D, E, R, K, G

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = F, M, V

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = V, L, I, A, T

<400> 71
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 72
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = F, Y, D, E, P, Q

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, I, V, A, T, Q

<220>
<221> VARIANT
<222> 3
<223> Xaa = L, I, M, F, Y, R, K, E

<220>
<221> VARIANT
<222> 4
<223> Xaa = W, Q

<220>
<221> VARIANT
<222> 5
<223> Xaa = F, W, R, K, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = any amino acid

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<221> VARIANT
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<223> Xaa = L, R

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = M, F, W, D, N, Q, R, K

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = F

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = L, I, V, A, T

<400> 72
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 73
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = L, I, V, M, R, H, K, G, D, E, Q, N, P

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, I, V, A, T, Q

<220>
<221> VARIANT
<222> 3
<223> Xaa = L, I, V, M, Y, F, W, G, Q, N, S, T, C

<220>
<221> VARIANT
<222> 4
<223> Xaa = D, E, S, T, C

<220>
<221> VARIANT
<222> 5
<223> Xaa = G, R, H, K

<220>
<221> VARIANT
<222> 6
<223> Xaa = L, I, V, M, G, D, E, R, H, K, Y, F, W, P

<220>

<221> VARIANT
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<223> Xaa = G, D, E, Q, N

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = Y, F, W, G, D, E, A

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = Y, F, W, L, I, V, M, D, E, R, H, K, P

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = P, G, Y, F, W, R, H, K, Q, N

<220>
<221> VARIANT
<222> (11)...(11)
<223> Xaa = L, I, V, A, T

<400> 73
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 74
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = D, E, S, T, C

<220>
<221> VARIANT
<222> 2
<223> Xaa = Q, V, T, I, A, M, L

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, D, E

<220>
<221> VARIANT
<222> 4
<223> Xaa = Q, N

<220>
<221> VARIANT
<222> 5

<223> Xaa = G

<220>

<221> VARIANT

<222> 6

<223> Xaa = A, P

<220>

<221> VARIANT

<222> (7)...(7)

<223> Xaa = D, E

<220>

<221> VARIANT

<222> (8)...(8)

<223> Xaa = any amino acid

<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = I, V, L, A, M, T

<400> 74

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 75

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = Q, N, Y, F, W, D, E, G, S, T, C

<220>

<221> VARIANT

<222> 2

<223> Xaa = Q, V, T, I, A, M, L

<220>

<221> VARIANT

<222> 3

<223> Xaa = Y, F, W, D, E, G

<220>

<221> VARIANT

<222> 4

<223> Xaa = S, T, C, P

<220>

<221> VARIANT

<222> 5

<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = A, D, E, R, H, K

<220>
<221> VARIANT
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<223> Xaa = L, I, V, M, P, G, Q, N

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = R, H, K, D, E

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = P, R, H, K

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = I, V, L, A, M, T

<400> 75
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 76
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
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<222> 1
<223> Xaa = Y, F, W, P

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, Q, V, A, I, T

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, R, H, K, D, E

<220>
<221> VARIANT
<222> 4
<223> Xaa = any amino acid

<220>
<221> VARIANT

<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = Y, F, W

<220>
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<222> (7)...(7)
<223> Xaa = G, A, Y, F, W

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<222> (8)...(8)
<223> Xaa = P, R, H, K

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = V, I, T, A, M, L

<400> 76
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 77
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
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<223> Xaa = Y, F, W, Q, N, D, E, L, I, V, M, P

<220>
<221> VARIANT
<222> 2
<223> Xaa = L, M, Q, V, A, T, I

<220>
<221> VARIANT
<222> 3
<223> Xaa = Y, F, W, R, H, K, S, T, C, D, E, G

<220>
<221> VARIANT
<222> 4
<223> Xaa = D, E, P

<220>
<221> VARIANT
<222> 5
<223> Xaa = A

<220>
<221> VARIANT
<222> 6
<223> Xaa = P

<220>
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<223> Xaa = L, I, V, M, P, G, Q, N

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = G, D, E, R, H, K, Y, F, W

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = A, R, H, K

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = V, I, T, A, M, L

<400> 77
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10

<210> 78
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = P

<220>
<221> VARIANT
<222> 2
<223> Xaa = Q, V, A, I, T, M, L

<220>
<221> VARIANT
<222> 3
<223> Xaa = L, I, V, M, G, R, H, K

<220>
<221> VARIANT
<222> 4
<223> Xaa = Q, N, P

<220>

<221> VARIANT
<222> 5
<223> Xaa = G, P

<220>
<221> VARIANT
<222> 6
<223> Xaa = A, P

<220>
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<222> (7)...(7)
<223> Xaa = D, E

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = Y, F, W

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = V, I, L, A, T, M

<400> 78
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 79
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> 1
<223> Xaa = Q, N, D, E, P

<220>
<221> VARIANT
<222> 2
<223> Xaa = Q, V, A, I, T, M, L

<220>
<221> VARIANT
<222> 3
<223> Xaa = Y, F, W, L, I, V, M, G, D, E, R, H, K, Q, N,
S, T, C

<220>
<221> VARIANT
<222> 4
<223> Xaa = any amino acid

<220>
<221> VARIANT

<222> 5
 <223> Xaa = D, E

<220>
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 <222> 6
 <223> Xaa = D, E

<220>
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 <223> Xaa = L, I, V, M, P, A, Q, N

<220>
 <221> VARIANT
 <222> (8)...(8)
 <223> Xaa = R, H, K, Q, N

<220>
 <221> VARIANT
 <222> (9)...(9)
 <223> Xaa = A, D, E, P, R, H, K

<220>
 <221> VARIANT
 <222> (10)...(10)
 <223> Xaa = V, I, L, A, T, M

<400> 79
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

<210> 80
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
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 <223> Xaa = Y, F, W, D, E, G, R, H, K

<220>
 <221> VARIANT
 <222> 2
 <223> Xaa = V, T, A, I, M

<220>
 <221> VARIANT
 <222> 3
 <223> Xaa = A, G, R, H, K, D, E

<220>
 <221> VARIANT
 <222> 4
 <223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 5
<223> Xaa = P, D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = R, H, K, A

<220>
<221> VARIANT
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<223> Xaa = A, R, H, K

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = V, I, L, A, M, T

<400> 80
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5

<210> 81
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
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<223> Xaa = P, Q, N, D, E, G

<220>
<221> VARIANT
<222> 2
<223> Xaa = V, T, A, I, M

<220>
<221> VARIANT
<222> 3
<223> Xaa = A, R, H, K, P, Q, N, G, D, E

<220>
<221> VARIANT
<222> 4
<223> Xaa = A, D, E, R, H, K, P

<220>

<221> VARIANT
 <222> 5
 <223> Xaa = D, E, Q, N, P, S, T, C

<220>
 <221> VARIANT
 <222> 6
 <223> Xaa = Q, N, R, H, K

<220>
 <221> VARIANT
 <222> (7)...(7)
 <223> Xaa = Q, N, Y, F, W, R, H, K, D, E, P, S, T, C

<220>
 <221> VARIANT
 <222> (8)...(8)
 <223> Xaa = R, H, K, D, E, Q, N

<220>
 <221> VARIANT
 <222> (9)...(9)
 <223> Xaa = any amino acid

<220>
 <221> VARIANT
 <222> (10)...(10)
 <223> Xaa = V, I, L, A, M, T

<400> 81
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

<210> 82
 <211> 9
 <212> PRT
 <213> Artificial Sequence

<220>
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 <223> Xaa = Y, F, P

<220>
 <221> VARIANT
 <222> 2
 <223> Xaa = L, M, V, T, Q, A, I

<220>
 <221> VARIANT
 <222> 3
 <223> Xaa = A, R, K, D, E

<220>
 <221> VARIANT
 <222> 4

<223> Xaa = any amino acid

<220>

<221> VARIANT

<222> 5

<223> Xaa = E

<220>

<221> VARIANT

<222> 6

<223> Xaa = A

<220>

<221> VARIANT

<222> (7)...(7)

<223> Xaa = D, E

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<221> VARIANT

<222> (8)...(8)

<223> Xaa = any amino acid

<220>

<221> VARIANT

<222> (9)...(9)

<223> Xaa = I, V, L, M, T, A

<400> 82

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa

1

5

<210> 83

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<221> VARIANT

<222> 1

<223> Xaa = F, Y, D, E, P

<220>

<221> VARIANT

<222> 2

<223> Xaa = L, M, V, T, Q, A, I

<220>

<221> VARIANT

<222> 3

<223> Xaa = F, Y, W, R, K, D, E, G

<220>

<221> VARIANT

<222> 4

<223> Xaa = P

<220>
<221> VARIANT
<222> 5
<223> Xaa = D, E

<220>
<221> VARIANT
<222> 6
<223> Xaa = any amino acid

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<223> Xaa = L, I, V, M, Q, N, P

<220>
<221> VARIANT
<222> (8)...(8)
<223> Xaa = H, R, K, D, Q, N

<220>
<221> VARIANT
<222> (9)...(9)
<223> Xaa = R, H, K

<220>
<221> VARIANT
<222> (10)...(10)
<223> Xaa = V, I, L, M, T, A

<400> 83
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10